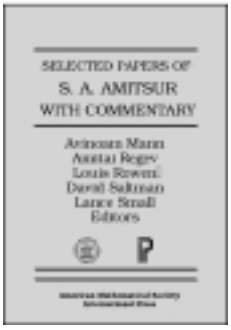
New Publications Offered by the AMS

Algebra and Algebraic Geometry



Selected Papers of S. A. Amitsur with Commentary, Parts 1 and 2

Avinoam Mann, *Hebrew University of Jerusalem, Israel*, **Amitai Regev**, *Weizmann Institute of Science, Rehovot, Israel*, **Louis Rowen**, *Bar-Ilan University, Ramat-Gan, Israel*, **David Saltman**, *University of Texas, Austin,* and **Lance Small**, *University of California, San Diego, La Jolla,* Editors

A lead figure in twentieth century noncommutative algebra, S. A. Amitsur's contributions are wide-ranging and enduring. These volumes collect almost all of his work. The papers are organized into broad topic areas: general ring theory, rings satisfying a polynomial identity, combinatorial polynomial identity theory, and division algebras. Included are essays by the editors on Amitsur's work in these four areas and a biography of Amitsur written by A. Mann. These volumes make a fine addition to any mathematics book collection.

Contents for Part 1: *General ring theory:* **L. Rowen**, Commentary: Amitsur and ring theory; A generalization of a theorem on linear differential equations; A general theory of radicals. I. Radicals in complete lattices; A general theory of radicals. II. Radicals in rings and bicategories; A general theory of radicals. III. Applications; Algebras over infinite fields; Radicals of polynomial rings; Invariant submodules of simple rings; Derivations in simple rings; The radical of field extensions; Countably generated division algebras over nondenumerable fields; Commutative linear differential operators; Rings with a pivotal monomial; On the semi-simplicity of group algebras; Derived functors in abelian categories; Remarks on principal ideal rings; Generalized polynomial identities and pivotal monomials; Rings with involution; Rings of quotients and Morita contexts; Nil radicals. Historical notes and some new results; On rings of quotients; with **G. Agnarsson** and **J. C. Robson**, Recognition of matrix rings II; *Rings satisfying a polynomial identity:* **L. W. Small**, Commentary: Amitsur and PI-rings; Nil PI-rings; An embedding of PI-rings; On rings with identities; The $T\$$-ideals of the free ring; A generalization of Hilbert's Nullstellensatz; Groups with representations of bounded degree II; with **C. Procesi**, Jacobson-rings and Hilbert algebras with polynomial identities; Nil semi-groups of rings with a polynomial identity; Rational identities and applications to algebra and geometry; Prime rings having polynomial identities with arbitrary coefficients; Identities in rings with involutions; A noncommutative Hilbert basis theorem and subrings of matrices; Embeddings in matrix rings; Some results on rings with polynomial identities; A note on PI-rings; On universal embeddings in matrix rings; Polynomial identities and Azumaya algebras; Polynomial identities; Central embeddings in semi-simple rings; with **L. W. Small**, Polynomials over division rings; with **L. W. Small**, Prime ideals in PI-rings; with **L. W. Small**, Finite-dimensional representations of PI algebras; with **L. W. Small**, GK-dimensions of corners and ideals; Contributions of PI theory to Azumaya algebras; with **L. W. Small**, Finite-dimensional representation of PI algebras, II; with **L. W. Small**, Algebras over infinite fields, revisited.

Collected Works

November 2001, approximately 610 pages, Hardcover, ISBN 0-8218-2924-6, **Individual member $62**, List $103, Institutional member $82, Order code CWORKS-AMITSUR1N

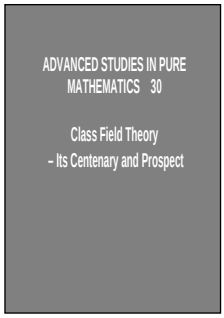
Contents for Part 2: *Combinatoiral polynomial identity theory:* **A. Regev**, Commentary: Amitsur and combinatorial P.I. theory; with **J. Levitzki**, Minimal identities for algebras; with **J. Levitzki**, Remarks on minimal identities for algebras; The identities of PI-rings; Identities and generators of matrix rings; Identities and linear dependence; On a central identity for matrix rings; Alternating identities; PI-algebras and their cocharacters; The sequence of codimensions of PI-algebras; *Division algebras:* **D. J. Saltman**, Commentary: Amitsur and division algebras; Contributions to the theory of central simple algebras; La représentation d'algèbres centrales simples; Construction d'algèbres centrales simples sur des corps de caractéristique zéro; Non-commutative cyclic fields; Differential polynomials and division algebras; Generic splitting fields of central simple algebras; Finite subgroups of division rings; Some results on central simple algebras; On arithmetic functions; Simple algebras and cohomology groups of arbitrary fields; Some results on arithmetic functions; Finite dimensional central divison algebras; Homology groups and double complexes for arbitrary fields; On a lemma in elementary proofs of the prime number theorem; Complexes of rings; On central division algebras; The generic division rings; Generic abelian crossed products and p-algebras; with **L. H. Rowen** and

J. P. Tignol, Division algebras of degree 4 and 8 with involution; On the characteristic polynomial of a sum of matrices; Generic splitting fields; Braver groups in ring theory and algebraic geometry; Extension of derivations to central simple algebras; with **J.-P. Tignol**, Kummer subfields of Malcev-Neumann division algebras; with **J. P. Tignol**, Symplectic modules; with **J.-P. Tignol**, Totally ramified splitting fields of central simple algebras over Henselian fields; Galois splitting fields of a universal division algebra; with **L. H. Rowen**, Elements of reduced trace 0; with **D. Baum**, Finite-dimensional subalgebras of division rings.

Collected Works

November 2001, approximately 625 pages, Hardcover, ISBN 0-8218-2925-4, **Individual member $63**, List $105, Institutional member $84, Order code CWORKS-AMITSUR2N

Set: October 2001, approximately 1224 pages, Hardcover, ISBN 0-8218-0688-2, 2000 *Mathematics Subject Classification*: 01A75, 16–06, **Individual member $119**, List $198, Institutional member $158, Order code CWORKS-AMITSURN



Class Field Theory—Its Centenary and Prospect

Katsuya Miyake, *Tokyo Metropolitan University, Japan,* Editor

A publication of the Mathematical Society of Japan.

This volume is a collection of articles contributed by the speakers at the Mathematical Society of Japan's Seventh International Research Institute entitled, "Class Field Theory—Its Centenary and Prospect", held in Tokyo in June 1998. Some of the articles are expository; they discuss important and interesting aspects of class field theory and contain full references. Other articles are historical; they vividly explain how leading number theorists in Europe and Japan developed and exchanged their mathematical ideas.

Contents: S. Iyanaga, Memories of Professor Teiji Takagi; **M. R. Murty**, On Artin L-functions; **G. Frei**, How Hasse was led to the theory of quadratic forms, the local-global principle, the theory of the norm residue symbol, the reciprocity laws, and to class field theory; **I. Fesenko**, Nonabelian local reciprocity maps; **A. Nomura**, Embedding problems with restricted ramifications and the class number of Hilbert class fields; **H. Koch**, The history of the theorem of Shafarevich in the theory of class formations; **M. Yamagishi**, A survey of p-extensions; **T. Nguyen Quang Do**, Galois module structure of p-class formations; **T. Zink**, A Dieudonné theory for p-divisible groups; **P. Stevenhagen**, Hilbert's 12th problem, complex multiplication and Shimura reciprocity; **D. R. Kohel**, Hecke module structure of quaternions; **I. Satake**, On classification of semisimple algebraic groups; **B. Casselman**, The L-group; **R. Gillard**, Groupe des obstructions pour les déformations de représentations Galoisiennes; **R. Schoof**, Abelian varieties over $\mathbf{Q}(\sqrt{6})$ with good reduction everywhere; **H. Yanai**, Hodge cycles and unramified class fields; **N. Otsubo**, Recent progress on the finiteness of torsion algebraic cycles; **K. Sato**, Finiteness of a certain motivic cohomology group of varieties over local and global fields; **R. Greenberg**, Iwasawa theory—Past and present; **M. Ozaki**, Iwasawa invariants of $\mathbb{Z}_p$-extensions over an imaginary quadratic field; **H. Taya**, On p-adic zeta functions and class groups of $\mathbb{Z}_p$-extensions of certain totally real fields; **W. Kohnen**, Class numbers of imaginary quadratic fields; **R. Okazaki**, On parities of relative class numbers of certain CM-extensions; **S. G. Hahn** and **D. H. Lee**, Some congruences for binomial coefficients; **J. Cougnard**, Stably free and not free rings of integers; **M. Ayadi**, **A. Azizi**, and **M. C. Ismaili**, The capitulation problem for certain number fields; **H. Suzuki**, On the capitulation problem; **M. Morishita** and **T. Watanabe**, Adele geometry of numbers; **T. Ono**, On Shafarevich-Tate sets; **P. Roquette**, Class field theory in characteristic p, its origin and development.

Advanced Studies in Pure Mathematics, Volume 30

May 2001, 631 pages, Hardcover, ISBN 4-931469-11-6, 2000 *Mathematics Subject Classification*: 11R37; 11F70, 11H99, 11M06, 11R23, 11R39, 11R42, 11R56, 11S37, 01A60, **Individual member $66**, List $110, Institutional member $88, Order code ASPM/30N

Gorenstein Liaison, Complete Intersection Liaison Invariants and Unobstructedness

Jan O. Kleppe, *Oslo University College, Norway*, **Juan C. Migliore**, *University of Notre Dame, IN*, **Rosa Miró-Roig**, *University of Barcelona, Spain*, **Uwe Nagel**, *University of Paderborn, Germany*, and **Chris Peterson**, *Colorado State University, Fort Collins*

Contents: Introduction; Preliminaries; Gaeta's theorem; Divisors on an ACM subscheme of projective spaces; Gorenstein ideals and Gorenstein liaison; CI-liaison invariants; Geometric applications of the CI-liaison invariants; Glicci curves on arithmetically Cohen-Macaulay surfaces; Unobstructedness and dimension of families of subschemes; Dimension of families of determinantal subschemes; Bibliography.

Memoirs of the American Mathematical Society

0065-9266, October 2001, 116 pages, Softcover, ISBN 0-8218-2738-3, LC 2001034317, 2000 *Mathematics Subject Classification*: 14M12, 14C05, 14H10, 14J15; 14N05, **Individual member $26**, List $43, Institutional member $34, Order code MEMO/154/732N

Tilings of the Plane, Hyperbolic Groups and Small Cancellation Conditions

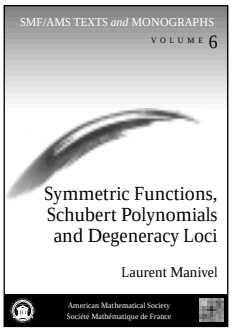
Milé Krajčevski, *University of South Florida, Tampa*

This item will also be of interest to those working in geometry and topology.

Contents: Preface; Acknowledgments; Introduction; Small cancellation theory of $\mathcal{T}$; Tilings; Bibliography.

Memoirs of the American Mathematical Society

0065-9266, October 2001, 59 pages, Softcover, ISBN 0-8218-2762-6, LC 2001034318, 2000 *Mathematics Subject Classification*: 20F65, 20F67; 05B45, 52C20, 57M05, **Individual member $24**, List $40, Institutional member $32, Order code MEMO/154/733N



Symmetric Functions, Schubert Polynomials and Degeneracy Loci

Laurent Manivel, *University of Grenoble, Saint Martin d'Heres, France*

From reviews of the French Edition:

Well-written book … all of the concepts are clearly defined and presented in an informal and pleasant way … an attractive book which presents the interplay between many diverse topics of algebraic combinatorics and their geometric realizations in Schubert calculus. It will be of great use to anyone wishing a brief and well-organized treatment of this material and particularly good for graduate students.

—Mathematical Reviews

Excellent text … with numerous further-leading exercises and remarks, and with a rich bibliography, which makes the study of it very profitable.

—Zentralblatt für Mathematik

This text grew out of an advanced course taught by the author at the Fourier Institute (Grenoble, France). It serves as an introduction to the combinatorics of symmetric functions, more precisely to Schur and Schubert polynomials. Also studied is the geometry of Grassmannians, flag varieties, and especially, their Schubert varieties. This book examines profound connections that unite these two subjects.

The book is divided into three chapters. The first is devoted to symmetric functions and especially to Schur polynomials. These are polynomials with positive integer coefficients in which each of the monomials correspond to a Young tableau with the property of being "semistandard". The second chapter is devoted to Schubert polynomials, which were discovered by A. Lascoux and M.-P. Schützenberger who deeply probed their combinatorial properties. It is shown, for example, that these polynomials support the subtle connections between problems of enumeration of reduced decompositions of permutations and the Littlewood-Richardson rule, a particularly efficacious version of which may be derived from these connections. The final chapter is geometric. It is devoted to Schubert varieties, subvarieties of Grassmannians, and flag varieties defined by certain incidence conditions with fixed subspaces.

This volume makes accessible a number of results, creating a solid stepping stone for scaling more ambitious heights in the area. The author's intent was to remain elementary: The first two chapters require no prior knowledge, the third chapter uses some rudimentary notions of topology and algebraic geometry. For this reason, a comprehensive appendix on the topology of algebraic varieties is provided. This book is the English translation of a text previously published in French.

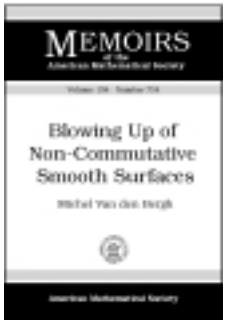
This item will also be of interest to those working in discrete mathematics and combinatorics.

SMF members are entitled to AMS member discounts.

Contents: Introduction; The ring of symmetric functions; Schubert polynomials; Schubert varieties; A brief introduction to singular homology; Bibliography; Index.

SMF/AMS Texts and Monographs, Volume 6

September 2001, approximately 176 pages, Softcover, ISBN 0-8218-2154-7, LC 2001041290, 2000 *Mathematics Subject Classification*: 05E05, 05E10, 14M15, 14N10, 20C30, 57T15, **All AMS members $35**, List $44, Order code SMFAMS/6N



Blowing Up of Non-Commutative Smooth Surfaces

Michel Van den Bergh, *University Centrum Limburg, Diepenbeek, Belgium*

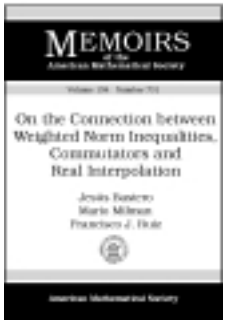
This item will also be of interest to those working in geometry and topology.

Contents: Introduction; Preliminaries on category theory; Non-commutative geometry; Pseudo-compact rings; Cohen-Macaulay curves embedded in quasi-schemes; Blowing up a point on a commutative divisor; Derived categories; The derived category of a non-commutative blowup; Some results on graded algebras and their sections; Quantum plane geometry; Blowing up n points in an elliptic quantum plane; Non-cummutative cubic surfaces; Appendix A. Two-categories; Appendix B. Summary of notations; Appendix C. Index of terminology; Bibliography.

Memoirs of the American Mathematical Society

0065-9266, October 2001, 140 pages, Softcover, ISBN 0-8218-2754-5, LC 2001027925, 2000 *Mathematics Subject Classification*: 16E40, **Individual member $29**, List $49, Institutional member $39, Order code MEMO/154/734N

Analysis



On the Connection between Weighted Norm Inequalities, Commutators and Real Interpolation

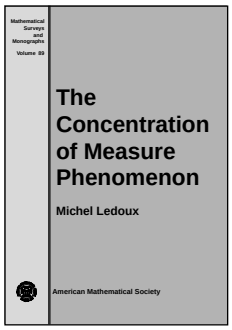
Jesús Bastero, *University of Zaragoza, Spain*, **Mario Milman**, *Florida Atlantic University, Boca Raton,* and **Francisco J. Ruiz**, *University of Zaragoza, Spain*

Contents: Introduction; Calderón weights; Applications to real interpolation: reiteration and extrapolation; Other classes of weights; Extrapolation of weighted norm inequalities via extrapolation theory; Applications to function spaces; Commutators defined by the K-method; Generalized commutators; The

quasi Banach case; Applications to harmonic analysis; BMO type spaces associated to Calderón weights; Atomic decompositions and duality; References.

Memoirs of the American Mathematical Society

0065-9266, October 2001, 80 pages, Softcover, ISBN 0-8218-2734-0, LC 2001034316, 2000 *Mathematics Subject Classification*: 46E30, 46B70, **Individual member $26**, List $43, Institutional member $34, Order code MEMO/154/731N



The Concentration of Measure Phenomenon

Michel Ledoux, *Université Paul-Sabatier, Toulouse, France*

The observation of the concentration of measure phenomenon is inspired by isoperimetric inequalities. A familiar example is the way the uniform measure on the standard sphere S^n becomes concentrated around the equator as the dimension gets large. This property may be interpreted in terms of functions on the sphere with small oscillations, an idea going back to Lévy. The phenomenon also occurs in probability, as a version of the law of large numbers, due to Emil Borel. This book offers the basic techniques and examples of the concentration of measure phenomenon. The concentration of measure phenomenon was put forward in the early seventies by V. Milman in the asymptotic geometry of Banach spaces. It is of powerful interest in applications in various areas, such as geometry, functional analysis and infinite-dimensional integration, discrete mathematics and complexity theory, and probability theory. Particular emphasis is on geometric, functional, and probabilistic tools to reach and describe measure concentration in a number of settings.

The book presents concentration functions and inequalities, isoperimetric and functional examples, spectrum and topological applications, product measures, entropic and transportation methods, as well as aspects of M. Talagrand's deep investigation of concentration in product spaces and its application in discrete mathematics and probability theory, supremum of Gaussian and empirical processes, spin glass, random matrices, etc. Prerequisites are a basic background in measure theory, functional analysis, and probability theory.

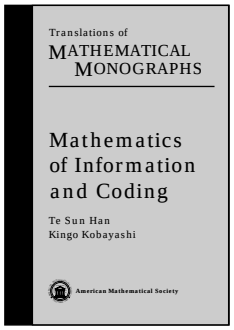
This item will also be of interest to those working in probability.

Contents: Concentration functions and inequalities; Isoperimetric and functional examples; Concentration and geometry; Concentration in product spaces; Entropy and concentration; Transportation cost inequalities; Sharp bounds of Gaussian and empirical processes; Selected applications; References; Index.

Mathematical Surveys and Monographs

September 2001, approximately 192 pages, Hardcover, ISBN 0-8218-2864-9, 2000 *Mathematics Subject Classification*: 28Axx, 46Bxx, 52Axx, 60–XX; 28C20, 28D20, 46G12, 58C30, 62G30, 82B44, **Individual member $35**, List $59, Institutional member $47, Order code SURV-LEDOUXN

Applications



Independent Study

Mathematics of Information and Coding

Te Sun Han and **Kingo Kobayashi**, *The University of Electro-Communications, Tokyo, Japan*

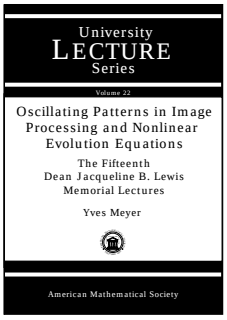
This book is intended to provide engineering and/or statistics students, communications engineers, and mathematicians with the firm theoretic basis of *source coding* (or *data compression*) in information theory. Although information theory consists of two main areas, source coding and channel coding, the authors choose here to focus only on source coding. The reason is that, in a sense, it is more basic than channel coding, and also because of recent achievements in source coding and compression. An important feature of the book is that whenever possible, the author describes *universal* coding methods, i.e., the methods that can be used without prior knowledge of the statistical properties of the data. The authors approach the subject of source coding from the very basics to the top frontiers in an intuitively transparent, but mathematically sound manner.

The book serves as a theoretical reference for communication professionals and statisticians specializing in information theory. It will also serve as an excellent introductory text for advanced-level and graduate students taking elementary or advanced courses in telecommunications, electrical engineering, statistics, mathematics, and computer science.

Contents: What is information theory?; Basics of information theory; Source and coding; Arithmetic code; Universal coding of integers; Universal coding of texts; Universal coding of compound sources; Data analysis and MDL principle; Bibliography; Index.

Translations of Mathematical Monographs

December 2001, approximately 296 pages, Hardcover, ISBN 0-8218-0534-7, LC 2001041262, 2000 *Mathematics Subject Classification*: 00A69, 94–02, 94A24, 94A29, 94A15, 94A45, 68P30, 62F03, 62F12, **Individual member $59**, List $99, Institutional member $79, Order code MMONO-HANN



Independent Study

Oscillating Patterns in Image Processing and Nonlinear Evolution Equations

The Fifteenth Dean Jacqueline B. Lewis Memorial Lectures

Yves Meyer, *École Normale Supérieure de Cachan, France*

Image compression, the Navier-Stokes equations, and detection of gravitational waves are three seemingly unrelated scientific

problems that, remarkably, can be studied from one perspective. The notion that unifies the three problems is that of "oscillating patterns", which are present in many natural images, help to explain nonlinear equations, and are pivotal in studying chirps and frequency-modulated signals.

The first chapter of this book considers image processing, more precisely algorithms of image compression and denoising. This research is motivated in particular by the new standard for compression of still images known as JPEG-2000. The second chapter has new results on the Navier-Stokes and other nonlinear evolution equations. Frequency modulated signals and their use in the detection of gravitational waves are covered in the final chapter.

In the book, the author describes both what the oscillating patterns are and the mathematics necessary for their analysis. It turns out that this mathematics involves new properties of various Besov-type function spaces and leads to many deep results, including new generalizations of famous Gagliardo-Nirenberg and Poincaré inequalities.

This book is based on the "Dean Jacqueline B. Lewis Memorial Lectures" given by the author at Rutgers University. It can be used either as a textbook in studying applications of wavelets to image processing or as a supplementary resource for studying nonlinear evolution equations or frequency-modulated signals. Most of the material in the book did not appear previously in monograph literature.

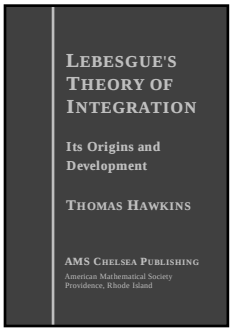
This item will also be of interest to those working in analysis.

Contents: Still images compression; The role of oscillations in some nonlinear PDE's; Frequency modulated signals, chirps and the Virgo program; Conclusion; References.

University Lecture Series, Volume 22

September 2001, approximately 136 pages, Softcover, ISBN 0-8218-2920-3, 2000 *Mathematics Subject Classification*: 35Q30, 42C40, 65T60, 76D05, 76D06, **All AMS members $20**, List $25, Order code ULECT/22N

General and Interdisciplinary



Lebesgue's Theory of Integration: Its Origins and Development

Thomas Hawkins, *Boston University, Massachussetts*

From reviews for the original edition:

Thomas Hawkins has set out to place Lebesgue's early work on integration theory … within its proper historical context … He has succeeded brilliantly … [He] has been able to convey the excitement of discovery and groping that must attend the birth of any fundamental theory … [He] has written a book that is the epitome of what a mathematical history should be.

—Science

This is a book which can be recommended to every mathematician.

—Zentralblatt für Mathematik

A clear exposition …

—Nature

Hawkins has written an excellent book, of value both to mathematicians and historians of science … Any teacher of advanced calculus will find the material in this book invaluable in motivating the introduction of Lebesgue's theory.

—Isis

The success of the book will be ensured because it is a genuinely historical study.

—British Journal of the History of Science

An interesting book … valuable to the worker in the field … brings out a number of ideas and results … It can be recommended highly to students who are getting their introduction to Lebesgue integration, particularly because it shows how an important mathematical idea develops, sometimes slowly, until it becomes an aesthetically satisfying structure.

—MAA Monthly

Lebesgue integration is one of the great success stories of modern mathematics, and Hawkins tells it very well. An introductory chapter sets the scene, describing how the first rigorous theory of integration took shape at the hands of Cauchy and Riemann. The book then plunges into fifty years of ferment, as researchers struggle to deal with "assumptionless" functions which will not fit the theory. Differentiable functions turn up with bounded derivatives which are not (Riemann) integrable; do they satisfy the fundamental theorem of calculus? Rectifiable curves are defined without assuming differentiability; must we give up the integral formula for length? To prove uniqueness for trigonometric series, we need a term-by-term integration of a series not converging uniformly; can it be justified? [One] falls into traps through not understanding the complexity of nowhere-dense sets, and through confusing them with the sets negligible in integration. The valid theorems have complicated hypotheses and even more complicated proofs. At the end of the century Hermite exclaims, "I turn away with fright and horror from this lamentable plague of functions which do not have derivatives." And then the key idea enters from a quite unexpected source.

—Bulletin of the AMS

In this book, Hawkins elegantly places Lebesgue's early work on integration theory within in proper historical context by relating it to the developments during the nineteenth century that motivated it and gave it significance and also to the contributions made in this field by Lebesgue's contemporaries.

Hawkins was awarded the 1997 MAA Chauvenet Prize and the 2001 AMS Albert Leon Whiteman Memorial Prize for notable exposition and exceptional scholarship in the history of mathematics.

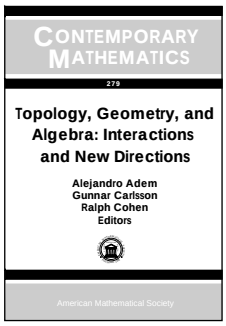
This item will also be of interest to those working in analysis.

AMS Chelsea Publishing

Contents: Riemann's theory of integration; The development of Riemann's ideas: 1870–80; Set theory and the theory of integration; The end of the century: A period of transition; The creation of modern integration theory; Pioneering applications of the Lebesgue integral; Epilogue: The Lebesgue-Stieltjes integral; Appendix: Dini's theorem on the differentiability of continuous functions; Glossary; Special symbols; List of abbreviations; Bibliography; Index.

September 2001, 227 pages, Hardcover, ISBN 0-8218-2963-7, 2000 *Mathematics Subject Classification*: 28–03, 01A05; 01A75, **All AMS members $26**, List $29, Order code CHEL/282.HN

Geometry and Topology



Topology, Geometry, and Algebra: Interactions and New Directions

Alejandro Adem, *University of Wisconsin, Madison,* and **Gunnar Carlsson** and **Ralph Cohen**, *Stanford University, CA*, Editors

This volume presents the proceedings from the conference on "Topology, Geometry, and Algebra: Interactions and New Directions" held in honor of R. James Milgram at Stanford University in August 1999. The meeting brought together distinguished researchers from a variety of areas related to algebraic topology and its applications.

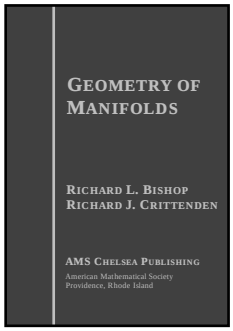
Papers in the book present a wide range of subjects, reflecting the nature of the conference. Topics include moduli spaces, configuration spaces, surgery theory, homotopy theory, knot theory, group actions, and more. Particular emphasis was given to the breadth of interaction between the different areas.

This item will also be of interest to those working in algebra and algebraic geometry.

Contents: G. Carlsson, On Jim Milgram's mathematical work; **M. Ando** and **J. Morava**, A renormalized Riemann-Roch formula and the Thom isomorphism for the free loop space; **M. Bendersky** and **D. M. Davis**, The 1-line of the K-theory Bousfield-Kan spectral sequence for $Spin(2n+1)$; **W. Browder**, Homologically exotic free actions on products of S^m; **S. E. Cappell**, **R. Lee**, and **E. Y. Miller**, Surgery formulae for analytical invariants of manifolds; **F. R. Cohen**, On genus one mapping class groups, function spaces, and modular forms; **B. Hanke**, Poincaré duality and deformations of algebras; **S. Kallel**, An analog of the May-Milgram model for configurations with multiplicities; **S. Kallel**, Configuration spaces and the topology of curves in projective space; **M. Karoubi**, Quantum methods in algebraic topology; **K. Liu** and **W. Zhang**, Adiabatic limits and foliations; **K. Mohnke**, Legendrian links of topological unknots; **A. Ranicki**, Algebraic Poincaré cobordism.

Contemporary Mathematics, Volume 279

September 2001, approximately 264 pages, Softcover, ISBN 0-8218-2063-X, 2000 *Mathematics Subject Classification*: 55Pxx, 55Rxx, 55Txx, 55Uxx, 57Nxx, 57Rxx, **Individual member $38**, List $64, Institutional member $51, Order code CONM/279N



Recommended Text

Geometry of Manifolds

Richard L. Bishop, *University of Illinois, Urbana,* and **Richard J. Crittenden**

From a review for the First Edition:

This book represents an excellent treatment of a wide section of modern differential geometry … The style is elegant and at the same time considerate for the needs of a beginner … a great number of well chosen problems with pertinent references … anybody who chooses to base his course on differential geometry at the graduate level on this book could do no better.

—Mathematical Reviews

From the Preface of the First Edition: "Our purpose in writing this book is to put material which we found stimulating and interesting as graduate students into form. It is intended for individual study and for use as a text for graduate level courses such as the one from which this material stems, given by Professor W. Ambrose at MIT in 1958–1959. Previously the material had been organized in roughly the same form by him and Professor I. M. Singer, and they in turn drew upon the work of Ehresmann, Chern, and É. Cartan. Our contributions have been primarily to fill out the material with details, asides and problems, and to alter notation slightly.

"We believe that this subject matter, besides being an interesting area for specialization, lends itself especially to a synthesis of several branches of mathematics, and thus should be studied by a wide spectrum of graduate students so as to break away from narrow specialization and see how their own fields are related and applied in other fields. We feel that at least part of this subject should be of interest not only to those working in geometry, but also to those in analysis, topology, algebra, and even probability and astronomy. In order that this book be meaningful, the reader's background should include real variable theory, linear algebra, and point set topology."

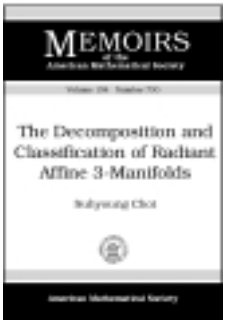
This volume is a reprint with few corrections of the original work published in 1964. Starting with the notion of differential manifolds, the first six chapters lay a foundation for the study of Riemannian manifolds through specializing the theory of connections on principle bundles and affine connections. The geometry of Riemannian manifolds is emphasized, as opposed to global analysis, so that the theorems of Hopf-Rinow, Hadamard-Cartan, and Cartan's local isometry theorem are included, but no elliptic operator theory. Isometric immersions are treated elegantly and from a global viewpoint. In the final chapter are the more complicated estimates on which much of the research in Riemannian geometry is based: the Morse index theorem, Synge's theorems on closed geodesics, Rauch's comparison theorem, and the original proof of the Bishop volume-comparison theorem (with Myer's Theorem as a corollary).

The first edition of this book was the origin of a modern treatment of global Riemannian geometry, using the carefully conceived notation that has withstood the test of time. The primary source material for the book were the papers and course notes of brilliant geometers, including É. Cartan, C. Ehresmann, I. M. Singer, and W. Ambrose. It is tightly organized, uniformly very precise, and amazingly comprehensive for its length.

Contents: Manifolds; Lie groups; Fibre bundles; Differential forms; Connexions; Affine connexions; Riemannian manifolds; Geodesics and complete Riemannian manifolds; Riemannian curvature; Immersions and the second fundamental form; Second variation of arc length; Appendix: Theorems on differential equations; Bibliography; Subject index.

AMS Chelsea Publishing

October 2001, 273 pages, Hardcover, ISBN 0-8218-2923-8, 2000 *Mathematics Subject Classification*: 53–01, **All AMS members $35**, List $39, Order code CHEL/344.HN



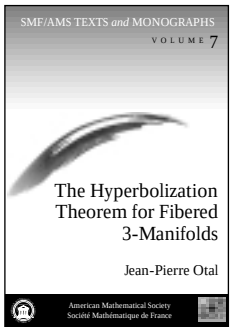
The Decomposition and Classification of Radiant Affine 3-Manifolds

Suhyoung Choi, *Seoul National University, Korea*

Contents: Introduction; Acknowledgement; Preliminary; $(n-1)$-convexity: previous results; Radiant vector fields, generalized affine suspensions, and the radial completeness; Three-dimensional radiant affine manifolds and concave affine manifolds; The decomposition along totally geodesic surfaces; 2-convex radiant affine manifolds; The claim and the rooms; The radiant tetrahedron case; The radiant trihedron case; Obtaining concave-cone affine manifolds; Concave-cone radiant affine 3-manifolds and radiant concave affine 3-manifolds; The nonexistence of pseudo-crescent-cones; Appendix A. Dipping intersections; Appendix B. Sequences of n-balls; Appendix C. Radiant affine 3-manifolds with boundary, and certain radiant affine 3-manifolds; Bibliography.

Memoirs of the American Mathematical Society, Volume 154, Number 730

October 2001, 122 pages, Softcover, ISBN 0-8218-2704-9, LC 2001034315, 2000 *Mathematics Subject Classification*: 57M50; 53A20, 53C15, 53C12, **Individual member $28**, List $47, Institutional member $38, Order code MEMO/154/730N



The Hyperbolization Theorem for Fibered 3-manifolds

Jean-Pierre Otal, *ENS-Lyon, France*

From a review of the French Edition:

The book is very well written … completely self-contained …
—Mathematical Reviews

A fundamental element of the study of 3-manifolds is Thurston's remarkable geometrization conjecture, which states that the interior of every compact 3-manifold has a canonical decomposition into pieces that have geometric structures. In most cases, these structures are complete metrics of constant negative curvature, that is to say, they are hyperbolic manifolds. The conjecture has been proved in some important cases, such as Haken manifolds and certain types of fibered manifolds. The influence of Thurston's hyperbolization theorem on the geometry and topology of 3-manifolds has been tremendous. This book presents a complete proof of the hyperbolization theorem for 3-manifolds that fiber over the circle, following the plan of Thurston's original (unpublished) proof, though the double limit theorem is dealt with in a different way.

The book is suitable for graduate students with a background in modern techniques of low-dimensional topology and will also be of interest to researchers in geometry and topology.

This is the English translation of a volume originally published in 1996 by the Société Mathématique de France.

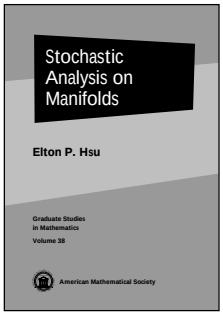
SMF members are entitled to AMS member discounts.

Contents: Teichmüller spaces and Kleinian groups; Real trees and degenerations of hyperbolic structures; Geodesic laminations and real trees; Geodesic laminations and the Gromov topology; The double limit theorem; The hyperbolization theorem for fibered manifolds; Sullivan's theorem; Actions of surface groups on real trees; Two examples of hyperbolic manifolds that fiber over the circle; Geodesic laminations; Bibliography; Index.

SMF/AMS Texts and Monographs, Volume 7

October 2001, approximately 133 pages, Softcover, ISBN 0-8218-2153-9, 2000 *Mathematics Subject Classification*: 57M07, 57M50, 20E08, 51M10, **All AMS members $31**, List $39, Order code SMFAMS/7N

Probability



Stochastic Analysis on Manifolds

Elton P. Hsu, *Northwestern University, Evanston, IL*

Probability theory has become a convenient language and a useful tool in many areas of modern analysis. The main purpose of this book is to explore part of this connection concerning the relations between Brownian motion on a manifold and analytical aspects of differential geometry. A dominant theme of the book is the probabilistic interpretation of the curvature of a manifold.

The book begins with a brief review of stochastic differential equations on Euclidean space. After presenting the basics of stochastic analysis on manifolds, the author introduces Brownian motion on a Riemannian manifold and studies the effect of curvature on its behavior. He then applies Brownian motion to geometric problems and vice versa, using many well-known examples, e.g., short-time behavior of the heat kernel on a manifold and probabilistic proofs of the Gauss-Bonnet-Chern theorem and the Atiyah-Singer index theorem for Dirac operators. The book concludes with an introduction to stochastic analysis on the path space over a Riemannian manifold.

This item will also be of interest to those working in geometry and topology.

Contents: Stochastic differential equations and diffusions; Basic stochastic differential geometry; Brownian motion on manifolds; Brownian motion and heat kernel; Short-time

asymptotics; Further applications; Brownian motion and analytic index theorems; Analysis on path spaces; Notes and comments; General notations; Bibliography; Index.

Graduate Studies in Mathematics, Volume 38

November 2001, approximately 273 pages, Hardcover, ISBN 0-8218-0802-8, LC 2001046052, 2000 *Mathematics Subject Classification*: 58J65, 60J60, 60J65, **All AMS members $35**, List $44,Order code GSM/38N

Previously Announced Publications

Supplementary Reading

Recommended Text

Arithmetic Algebraic Geometry

Brian Conrad, *University of Michigan, Ann Arbor,* and **Karl Rubin**, *Stanford University, CA*, Editors

The articles in this volume are expanded versions of lectures delivered at the Graduate Summer School and at the Mentoring Program for Women in Mathematics held at the Institute for Advanced Study/Park City Mathematics Institute. The theme of the program was arithmetic algebraic geometry. The choice of lecture topics was heavily influenced by the recent spectacular work of Wiles on modular elliptic curves and Fermat's Last Theorem. The main emphasis of the articles in the volume is on elliptic curves, Galois representations, and modular forms. One lecture series offers an introduction to these objects. The others discuss selected recent results, current research, and open problems and conjectures. The book would be a suitable text for an advanced graduate topics course in arithmetic algebraic geometry.

IAS/Park City Mathematics Series, Volume 9

August 2001, 569 pages, Hardcover, ISBN 0-8218-2173-3, LC 2001035291, 2000 *Mathematics Subject Classification*: 11F11, 11F33, 11F70, 11F80, 11G07, 11G18, 11R23, 11S25, 11G05, **All AMS members $60**, List $75, Order code PCMS/9RT109

Recommended Text

Plane Algebraic Curves

Gerd Fischer, *Heinrich-Heine-Universität, Düsseldorf, Germany*

From a review for the German Edition:

The present book provides a completely self-contained introduction to complex plane curves from the traditional algebraic-analytic viewpoint. The arrangement of the material is of outstanding instructional skill, and the text is written in a very lucid, detailed and enlightening style … Compared to the many other textbooks on (plane) algebraic curves, the present new one comes closest in spirit and content, to the work of E. Brieskorn and H. Knoerrer … One could say that the book under review is a beautiful, creative and justifiable abridged version of this work, which also stresses the analytic-topological point of view … the present book is a beautiful invitation to algebraic geometry, encouraging for beginners, and a welcome source for teachers of algebraic geometry, especially for those who want to give an introduction to the subject on the undergraduate-graduate level, to cover some not too difficult topics in substantial depth, but to do so in the shortest possible time.

—Zentralblatt für Mathematik

The study of the zeroes of polynomials, which for one variable is essentially algebraic, becomes a geometric theory for several variables. In this book, Fischer looks at the classic entry point to the subject: plane algebraic curves. Here one quickly sees the mix of algebra and geometry, as well as analysis and topology, that is typical of complex algebraic geometry, but without the need for advanced techniques from commutative algebra or the abstract machinery of sheaves and schemes.

In the first half of this book, Fischer introduces some elementary geometrical aspects, such as tangents, singularities, inflection points, and so on. The main technical tool is the concept of intersection multiplicity and Bézout's theorem. This part culminates in the beautiful Plücker formulas, which relate the various invariants introduced earlier.

The second part of the book is essentially a detailed outline of modern methods of local analytic geometry in the context of complex curves. This provides the stronger tools needed for a good understanding of duality and an efficient means of computing intersection multiplicities introduced earlier. Thus, we meet rings of power series, germs of curves, and formal parametrizations. Finally, through the patching of the local information, a Riemann surface is associated to an algebraic curve, thus linking the algebra and the analysis.

Concrete examples and figures are given throughout the text, and when possible, procedures are given for computing by using polynomials and power series. Several appendices gather supporting material from algebra and topology and expand on interesting geometric topics.

This is an excellent introduction to algebraic geometry, which assumes only standard undergraduate mathematical topics: complex analysis, rings and fields, and topology. Reading this book will help the student establish the appropriate geometric intuition that lies behind the more advanced ideas and techniques used in the study of higher dimensional varieties.

This is the English translation of a German work originally published by Vieweg Verlag (Wiesbaden, Germany).

This item will also be of interest to those working in geometry and topology.

Student Mathematical Library, Volume 15

August 2001, 231 pages, Softcover, ISBN 0-8218-2122-9, LC 2001031597, 2000 *Mathematics Subject Classification*: 14H50, 14Hxx, 14–01, **All AMS members $28**, List $35, Order code STML/15RT109

Independent Study

Recommended Text

Vertex Algebras and Algebraic Curves

Edward Frenkel, *University of California, Berkeley,* and **David Ben-Zvi**, *University of Chicago, IL*

Vertex algebras are algebraic objects that formalize the concepts of vertex operators and operator product expansion from two-dimensional conformal field theory. In the fifteen years since they were introduced by R. Borcherds, vertex algebras have turned out to be extremely useful in many areas of mathematics. They are by now ubiquitous in the representation theory of infinite-dimensional Lie algebras. They have also

found applications in such fields as algebraic geometry, theory of finite groups, modular functions, topology, integrable systems, and combinatorics. This book is an introduction to the theory of vertex algebras with a particular emphasis on the relationship between vertex algebras and the geometry of algebraic curves.

The notion of a vertex algebra is introduced in the book in coordinate-independent way, allowing the authors to give global geometric meaning to vertex operators on arbitrary smooth algebraic curves, possibly equipped with some additional data. To each vertex algebra and a smooth curve, they attach an invariant called the space of conformal blocks. When the complex structure of the curve and other geometric data vary, these spaces combine into a sheaf on the relevant moduli space. From this perspective, vertex algebras appear as algebraic objects that encode the geometric structure of various moduli spaces associated with algebraic curves.

Numerous examples and applications of vertex algebras are included, such as the Wakimoto realization of affine Kac-Moody algebras, integral solutions of the Knizhnik-Zamolodchikov equations, classical and quantum Drinfeld-Sokolov reductions, and the W-algebras. Among other topics discussed in the book are vertex Poisson algebras, Virasoro uniformization of the moduli spaces of curves, the geometric Langlands correspondence, and the chiral de Rham complex. The authors also establish a connection between vertex algebras and chiral algebras, recently introduced by A. Beilinson and V. Drinfeld.

This book may be used by the beginners as an entry point to the modern theory of vertex algebras, and by more experienced readers as a guide to advanced studies in this dynamic field.

Mathematical Surveys and Monographs, Volume 88

August 2001, 348 pages, Hardcover, ISBN 0-8218-2894-0, LC 2001032794, 2000 *Mathematics Subject Classification*: 17B69; 81R10, 81T40, 17B65, 17B67, 17B68, 14D20, 14D21, 14H10, 14H60, 14H81, **All AMS members $44**, List $55, Order code SURV/88RT109

Recommended Text

Algebraic Geometry for Beginners

C. Musili, *University of Hyderabad, India*

A publication of the Hindustan Book Agency.

This volume offers a nearly self-contained introduction to some of the basic concepts of algebraic geometry. Prerequisites have been kept to a minimum in order to examine the following areas and some of their standard applications: Bézout's Theorem, the Fundamental Theorem of Projective Geometry, and Zariski's Main Theorem. The exposition is modern, but in the language of "varieties", rather than that of "schemes", making it more accessible to the non-expert. There is extensive coverage of plane curves, including elliptic curves and complex tori, moduli questions, and applications to cryptology.

Distributed worldwide except in India by the American Mathematical Society.

Number 7

March 2001, 335 pages, Hardcover, ISBN 81-85931-27-5, 2000 *Mathematics Subject Classification*: 13–XX, 14–XX, **All AMS members $30**, List $38, Order code HIN/7RT109

Recommended Text

Principles of Functional Analysis

Second Edition

Martin Schechter, *University of California, Irvine*

From a review for the First Edition:

'Charming' is a word that seldom comes to the mind of a science reviewer, but if he is charmed by a treatise, why not say so? I am charmed by this book.

Professor Schechter has written an elegant introduction to functional analysis including related parts of the theory of integral equations. It is easy to read and is full of important applications. He presupposes very little background beyond advanced calculus; in particular, the treatment is not burdened by topological 'refinements' which nowadays have a tendency of dominating the picture.

The book can be warmly recommended to any reader who wants to learn about this subject without being deterred by less relevant introductory matter or scared away by heavy prerequisites.

—The American Scientist

Functional analysis plays a crucial role in the applied sciences as well as in mathematics. It is a beautiful subject that can be motivated and studied for its own sake. In keeping with this basic philosophy, the author has made this introductory text accessible to a wide spectrum of students, including beginning-level graduates and advanced undergraduates.

The exposition is inviting, following threads of ideas, describing each as fully as possible, before moving on to a new topic. Supporting material is introduced as appropriate, and only to the degree needed. Some topics are treated more than once, according to the different contexts in which they arise.

The prerequisites are minimal, requiring little more than advanced calculus and no measure theory. The text focuses on normed vector spaces and their important examples, Banach spaces and Hilbert spaces. The author also includes topics not usually found in texts on the subject.

This Second Edition incorporates many new developments while not overshadowing the book's original flavor. Areas in the book that demonstrate its unique character have been strengthened. In particular, new material concerning Fredholm and semi-Fredholm operators is introduced, requiring minimal effort as the necessary machinery was already in place. Several new topics are presented, but relate to only those concepts and methods emanating from other parts of the book. These topics include perturbation classes, measures of noncompactness, strictly singular operators, and operator constants.

Overall, the presentation has been refined, clarified, and simplified, and many new problems have been added.

Graduate Studies in Mathematics, Volume 36

September 2001, 393 pages, Hardcover, ISBN 0-8218-2895-9, LC 2001031601, 2000 *Mathematics Subject Classification*: 46–01, 47–01, 46B20, 46B25, 46C05, 47A05, 47A07, 47A12, 47A53, 47A55, **All AMS members $47**, List $59, Order code GSM/36RT109

Recommended Text

Triangle of Thoughts

Alain Connes, **André Lichnerowicz**, and **Marcel Paul Schützenberger**

Our view of the world today is fundamentally influenced by twentieth century results in physics and mathematics. Here, three members of the French Academy of Sciences: Alain Connes, André Lichnerowicz, and Marcel Paul Schützenberger, discuss the relations among mathematics, physics and philosophy, and other sciences. Written in the form of conversations among three brilliant scientists and deep thinkers, the book touches on, among others, the following questions:

- Is there a "primordial truth" that exists beyond the realm of what is provable? More generally, is there a distinction between what is true in mathematics and what is provable?
- How is mathematics different from other sciences? How is it the same? Does mathematics have an "object" or an "object of study", the way physics, chemistry and biology do?
- Mathematics is a lens, through which we view the world. Connes, Lichnerowicz, and Schützenberger examine that lens, to understand how it affects what we do see, but also to understand how it limits what we can see.
- How does a well-informed mathematician view fundamental topics of physics, such as: quantum mechanics, general relativity, quantum gravity, grand unification, and string theory?
- What are the relations between computational complexity and the laws of physics?
- Can pure thought alone lead physicists to the right theories, or must experimental data be the driving force? How should we compare Heisenberg's arrival at matrix mechanics from spectral data to Einstein's arrival at general relativity through his thought experiments?

The conversations are sprinkled with stories and quotes from outstanding scientists, which enliven the discourse. The book will make you think again about things that you once thought were quite familiar.

Alain Connes is one of the founders of non-commutative geometry. He holds the Chair of Analysis and Geometry at the Collège de France. He was awarded the Fields Medal in 1982. In 2001, he was awarded the Crafoord Prize by The Royal Swedish Academy of Sciences.

André Lichnerowicz, mathematician, noted geometer, theoretical physicist, and specialist in general relativity, was a professor at the Collège de France.

Marcel Paul Schützenberger made brilliant contributions to combinatorics and graph theory. He was simultaneously a medical doctor, a biologist, a psychiatrist, a linguist, and an algebraist.

June 2001, 179 pages, Hardcover, ISBN 0-8218-2614-X, LC 00-065064, 2000 *Mathematics Subject Classification*: 00A30, **All AMS members $24**, List $30, Order code TOTRT109

Teaching Mathematics in Colleges and Universities: Case Studies for Today's Classroom

Graduate Student Edition

Solomon Friedberg, *Boston College, Chestnut Hill, MA, Avner Ash, Elizabeth Brown, Deborah Hughes Hallet, Reva Kasman, Margaret Kenney, Lisa A. Mantini, William McCallum, Jerry Teitelbaum, and Lee Zia*

Progress in mathematics frequently occurs first by studying particular examples and then by generalizing the patterns that have been observed into far-reaching theorems. Similarly, in teaching mathematics one often employs examples to motivate a general principle or to illustrate its use. This volume uses the same idea in the context of learning *how* to teach: By analyzing particular teaching situations, one can develop broadly applicable teaching skills useful for the professional mathematician. These teaching situations are the Case Studies of the title.

Just as a good mathematician seeks both to understand the details of a particular problem and to put it in a broader context, the examples presented here are chosen to offer a serious set of detailed teaching issues and to afford analysis from a broad perspective.

Each case raises a variety of pedagogical and communication issues that may be explored either individually or in a group facilitated by a faculty member.

The methodology of Case Studies is widely used in areas such as business and law. The consideration of the mathematics cases presented here will help readers to develop teaching skills for their own classrooms.

This series is published in cooperation with the Mathematical Association of America.

CBMS Issues in Mathematics Education, Volume 10

June 2001, 67 pages, Softcover, ISBN 0-8218-2823-1, LC 2001022683, 2000 *Mathematics Subject Classification*: 00A35, 97D40; 00A05, 97C70, 97D30, 97D50, 97D60, 97D70, 97U70, **All AMS members $13**, List $16, Order code CBMATH/10RT109

Teaching Mathematics in Colleges and Universities: Case Studies for Today's Classroom

Faculty Edition

Solomon Friedberg, *Boston College, Chestnut Hill, MA,* and members of the Boston College Mathematics Case Studies Project Development Team

This series is published in cooperation with the Mathematical Association of America.

CBMS Issues in Mathematics Education, Volume 10

June 2001, 158 pages, Softcover, ISBN 0-8218-2875-4, 2000 *Mathematics Subject Classification*: 00A35, 97D40; 00A05, 97C70, 97D30, 97D50, 97D60, 97D70, 97U70, **All AMS members $23**, List $29, Order code CBMATH/10.FRT109

Recommended Text

Geometry of Differential Forms

Shigeyuki Morita, *University of Tokyo, Japan*

Since the times of Gauss, Riemann, and Poincaré, one of the principal goals of the study of manifolds has been to relate local analytic properties of a manifold with its global topological properties. Among the high points on this route are the Gauss-Bonnet formula, the de Rham complex, and the Hodge theorem; these results show, in particular, that the central tool in reaching the main goal of global analysis is the theory of differential forms.

The book by Morita is a comprehensive introduction to differential forms. It begins with a quick introduction to the notion of differentiable manifolds and then develops basic properties of differential forms as well as fundamental results concerning them, such as the de Rham and Frobenius theorems. The second half of the book is devoted to more advanced material, including Laplacians and harmonic forms on manifolds, the concepts of vector bundles and fiber bundles, and the theory of characteristic classes. Among the less traditional topics treated is a detailed description of the Chern-Weil theory.

The book can serve as a textbook for undergraduate students and for graduate students in geometry.

Translations of Mathematical Monographs (*Iwanami Series in Modern Mathematics*), Volume 201

August 2001, approximately 352 pages, Softcover, ISBN 0-8218-1045-6, LC 2001022608, 2000 *Mathematics Subject Classification*: 57Rxx, 58Axx, **All AMS members $42**, List $53, Order code MMONO/201RT109

Advances in Algebraic Geometry Motivated by Physics

Emma Previato, *Boston University, MA*, Editor

Our knowledge of objects of algebraic geometry such as moduli of curves, (real) Schubert classes, fundamental groups of complements of hyperplane arrangements, toric varieties, and variation of Hodge structures, has been enhanced recently by ideas and constructions of quantum field theory, such as mirror symmetry, Gromov-Witten invariants, quantum cohomology, and gravitational descendants.

These are some of the themes of this refereed collection of papers, which grew out of the special session, "Enumerative Geometry in Physics," held at the AMS meeting in Lowell, MA, April 2000. This session brought together mathematicians and physicists who reported on the latest results and open questions; all the abstracts are included as an Appendix, and also included are papers by some who could not attend.

The collection provides an overview of state-of-the-art tools, links that connect classical and modern problems, and the latest knowledge available.

This item will also be of interest to those working in algebra and algebraic geometry.

Contributors include: A. I. Suciu, S. J. Kovács, F. Sottile, D. Abramovich, A. Bertram, F. Oort, L. Caporaso, E. Cattani, J. Fernandez, H. Clemens, R. Vakil, D. A. Cox, S. Katz, Y.-P. Lee, T. J. Jarvis, T. Kimura, A. Vaintrob, B. Kreußler, A. R. Mavlyutov, A. Polishchuk, A. Postnikov, S. Rosenberg, M. Vajiac, C. Woodward, and E. Previato.

Contemporary Mathematics, Volume 276

July 2001, 294 pages, Softcover, ISBN 0-8218-2810-X, LC 2001022549, 2000 *Mathematics Subject Classification*: 13P10, 14–XX, 32G20, 32S22, 53Cxx, 53D45; 20Fxx, 57M05, 65H20, 93B55, **Individual member $45**, List $75, Institutional member $60, Order code CONM/276RT109

Topics in Probability and Lie Groups: Boundary Theory

J. C. Taylor, *McGill University, Montreal, PQ, Canada*, Editor

This volume is comprised of two parts: the first contains articles by S. N. Evans, F. Ledrappier, and Figà-Talomanaca. These articles arose from a Centre de Recherches de Mathématiques (CRM) seminar entitiled, "Topics in Probability on Lie Groups: Boundary Theory".

Evans gives a synthesis of his pre-1992 work on Gaussian measures on vector spaces over a local field. Ledrappier uses the freegroup on d generators as a paradigm for results on the asymptotic properties of random walks and harmonic measures on the Martin boundary. These articles are followed by a case study by Figà-Talamanca using Gelfand pairs to study a diffusion on a compact ultrametric space.

The second part of the book is an appendix to the book *Compactifications of Symmetric Spaces* (Birkhauser) by Y. Guivarc'h and J. C. Taylor. This appendix consists of an article by each author and presents the contents of this book in a more algebraic way. L. Ji and J.-P. Anker simplifies some of their results on the asymptotics of the Green function that were used to compute Martin boundaries. And Taylor gives a self-contained account of Martin boundary theory for manifolds using the theory of second order strictly elliptic partial differential operators.

Contributors include: J.-P. Anker, L. Ji, S. N. Evans, A. Figà-Talamanca, Y. Guivarc'h, J. C. Taylor, and F. Ledrappier.

CRM Proceedings & Lecture Notes, Volume 28

July 2001, 202 pages, Softcover, ISBN 0-8218-0275-5, LC 2001032073, 2000 *Mathematics Subject Classification*: 60B99; 31C35, 22E30, 22E46, 60J50, **Individual member $35**, List $59, Institutional member $47, Order code CRMP/28RT109

Classic

Recommended Text

Back in Print from the AMS

Differential and Integral Calculus

Third Edition

Edmund Landau

And what a book it is! The marks of Landau's thoroughness and elegance, and of his undoubted authority, impress themselves on the reader at every turn, from the opening of the preface … to the closing of the final chapter. It is a book that all analysts … should possess … to see how a master of his craft like Landau presented the calculus when he was at the height of his power and reputation.

—***Mathematical Gazette***

After completing his famous *Foundations of Analysis* (See AMS Chelsea Publishing, Volume 79.H for the English Edition and AMS Chelsea Publishing, Volume 141 for the German Edition,

Grundlagen der Analysis), Landau turned his attention to this book on calculus. The approach is that of an unrepentant analyst, with an emphasis on functions rather than on geometric or physical applications. The book is another example of Landau's formidable skill as an expositor. It is a masterpiece of rigor and clarity.

AMS Chelsea Publishing

January 1965, 372 pages, Hardcover, ISBN 0-8218-2830-4, LC 60-8966, 2000 *Mathematics Subject Classification*: 26–01, 01A75, **All AMS members $33**, List $37, Order code CHEL/78.HRT109

NEW AMS PUBLICATIONS